

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. PATENT NUMBER 7,033,589 Issued: April 25, 2006
Inventor(s): Mitchell REFF et al. Confirmation No.: 3037
Application No. 09/292,053 Group Art Unit: 1644
Filed: April 14, 1999 Examiner: Phuong N. HUYNH
Title: GAMMA-1 ANTI-HUMAN CD23 MONOCLONAL ANTIBODIES AND USE
THEREOF AS THERAPEUTICS

* * * * *

REQUEST FOR CERTIFICATE OF CORRECTION
PURSUANT TO 37 C.F.R. § 1.323

ATTN: Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. §1.323, the patentees respectfully request that a Certificate of Correction be issued for the above-identified patent to correct typographical errors in the specification and replace the Sequence Listing of U.S. Patent No. 7,033,589 with the corrections and replacement Sequence Listing submitted herewith on the enclosed Form PTO/SB/44.

The replacement Sequence Listing corresponds to the Substitute Sequence Listing submitted on 22 July 2004 and stamped as received by the Office of Initial Patent Examination. However, the sequences in the Sequence Listing of U.S. Patent No. 7,033,589 are presented in a different order than the sequences of the Substitute Sequence Listing submitted on 22 July 2004. Copies of both sequence listings are submitted herewith.

Specifically, the nucleotide sequences encoding the 6G5 and 5E8 light chain and heavy chain variable regions are identified as SEQ ID NOs: 1, 3, 5, and 7 in the Substitute Sequence Listing. However, these same sequences are identified as SEQ ID NOs: 1, 2, 3, and 4 in U.S. Patent No. 7,033,589. Likewise, the corresponding amino acid sequences of the

U.S. Patent No. 7,033,589
Attorney Docket No. 037003-0275739

6G5 and 5E8 light chain and heavy chain variable regions are identified as SEQ ID NOs: 2, 4, 6, and 8 in the Substitute Sequence Listing. However, these same sequences are identified as SEQ ID NOs: 36, 37, 38, and 39 in U.S. Patent No. 7,033,589. As such, the SEQ ID NOs in the Sequence Listing of U.S. Patent No. 7,033,589 are not consistent with parts of the specification and issued claims 1, 4, 9, 10, 14, and 15.

The typographical errors are the fault of the applicant, but the errors in the Sequence Listing are the fault of the Patent Office. The proposed corrections do not constitute new matter or require reexamination.

The required fee under 37 C.F.R. §1.20(a) is submitted herewith via EFS Web charge authorization.

Respectfully submitted,
PILLSBURY WINTHROP SHAW PITTMAN LLP

/ julie broadus meigs /

By: _____
Julie Broadus Meigs, Ph.D.
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Date: October 31, 2008

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF

Mitchell R. REFF et al.

Group Art Unit: 1644

Appln. No.: 09/292,053

Examiner: Phuong N. Huynh

Filed: April 14, 1999

Confirmation No. 3037

Title: GAMMA-1 ANTI-HUMAN CD23 MONOCLONAL ANTIBODIES AND USE THEREOF AS THERAPEUTICS

* * * * *

STATEMENT PURSUANT TO 37 C.F.R § 1.821(f)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. § 1.821(f), the applicants, through their undersigned attorney, state that the content of the paper copy of the Sequence Listing and the computer-readable format copy of the Sequence Listing, both submitted herewith, are the same.

Respectfully submitted,

Thomas A. Cawley, Jr., Ph.D.
Registration Number 40,944

Date: July 22, 2004
PILLSBURY WINTHROP LLP
Telephone: (703) 905-2000
Facsimile: (703) 905-2500
P.O. Box 10500
McLean, VA 22102
TAC/JBM



SEQUENCE LISTING

<110> REFF, MITCHELL E.
KLOETZER, WILLIAM S.
NAKAMURA, TAKEHIKO

<120> GAMMA-1 AND GAMMA-3 ANTI-HUMAN CD23 MONOCLONAL ANTIBODIES AND USE
THEREOF AS THERAPEUTICS

<130> 037003-0275739

<140> 09/292,053

<141> 1999-04-14

<150> 08/803,085

<151> 1997-02-20

<160> 39

<170> PatentIn Ver. 2.1

<210> 1

<211> 390

<212> DNA

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World Monkey (macaque); leader sequence is an artificial sequence to
facilitate cloning

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<221> misc_feature

<222> (1)..(57)

<223> leader sequence

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<221> mat_peptide

<222> (58)..(390)

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<221> CDS

<222> (1)..(390)

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Met Ala Trp Thr Leu Leu Val Thr Leu Leu Thr Gln Gly Thr Gly
-15 -10 -5

tcc tgg gct cag tct gcc ccg act cag cct ccc tct gtg tct ggg tct 96
Ser Trp Ala Gln Ser Ala Pro Thr Gln Pro Pro Ser Val Ser Gly Ser
-1 1 5 10

cct gga cag tcg gtc acc atc tcc tgc act gga acc agc gat gac gtt 144
Pro Gly Gln Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Asp Asp Val
15 20 25

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ggt ggt tat aac tat gtc tcc tgg tac caa cac cac cca ggc aaa gcc 192
Gly Gly Tyr Asn Tyr Val Ser Trp Tyr Gln His His Pro Gly Lys Ala
30          35          40          45

ccc aaa ctc atg att tat gat gtc gct aag cgg gcc tca ggg gtc tct 240
Pro Lys Leu Met Ile Tyr Asp Val Ala Lys Arg Ala Ser Gly Val Ser
50          55          60

gat cgc ttc tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc 288
Asp Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile
65          70          75

tct ggg ctc cag gct gag gac gag gct gat tat tac tgt tgt tca tat 336
Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr
80          85          90

aca acc agt agc act ttg tta ttc gga aga ggg acc cgg ttg acc gtc 384
Thr Thr Ser Ser Thr Leu Leu Phe Gly Arg Gly Thr Arg Leu Thr Val
95          100          105

cta ggt
Leu Gly
110
390

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<210> 2
<211> 130
<212> PRT
<213> Artificial Sequence

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Met Ala Trp Thr Leu Leu Leu Val Thr Leu Leu Thr Gln Gly Thr Gly
-15          -10          -5

Ser Trp Ala Gln Ser Ala Pro Thr Gln Pro Pro Ser Val Ser Gly Ser
-1 1          5          10

Pro Gly Gln Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Asp Asp Val
15          20          25

Gly Gly Tyr Asn Tyr Val Ser Trp Tyr Gln His His Pro Gly Lys Ala
30          35          40          45

Pro Lys Leu Met Ile Tyr Asp Val Ala Lys Arg Ala Ser Gly Val Ser
50          55          60

Asp Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile
65          70          75

Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr
80          85          90

Thr Thr Ser Ser Thr Leu Leu Phe Gly Arg Gly Thr Arg Leu Thr Val
95          100          105

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Leu Gly
110

<210> 3
<211> 423
<212> DNA
<213> Artificial Sequence

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<222> (1)..(57)
<223> leader sequence

<220>
<221> mat_peptide
<222> (58)..(423)

<220>
<221> CDS
<222> (1)..(423)

<400> 3

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Met Lys His Leu Trp Phe Phe Leu Leu Leu Val Ala Ala Pro Arg Trp	
-15 -10 -5	
gtc ctg tcc cag ctg cag ctg cag gag tgc ggc cca gga gtg gtg aag	96
Val Leu Ser Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Val Val Lys	
-1 1 5 10	
cct tgc gag acc ctg tcc ctc acc tgc gct gtc tct ggt ggc tct gtc	144
Pro Ser Glu Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Val	
15 20 25	
agc agt agt aac tgg tgg acc tgg atc cgc cag ccc cca ggg aag gga	192
Ser Ser Ser Asn Trp Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly	
30 35 40 45	
ctg gag tgg att gga cgt atc tct ggt agt ggt ggg gcc acc aac tac	240
Leu Glu Trp Ile Gly Arg Ile Ser Gly Ser Gly Gly Ala Thr Asn Tyr	
50 55 60	
aac ccg tcc ctc aag agt cga gtc atc att tca caa gac acg tcc aag	288
Asn Pro Ser Leu Lys Ser Arg Val Ile Ile Ser Gln Asp Thr Ser Lys	
65 70 75	
aac cag ttc tcc ctg aac ctg aac tct gtg acc gcc gcg gac acg gcc	336
Asn Gln Phe Ser Leu Asn Leu Asn Ser Val Thr Ala Ala Asp Thr Ala	
80 85 90	
gtg tat tac tgt gcc aga gat tgg gcc caa ata gct gga aca acg cta	384
Val Tyr Tyr Cys Ala Arg Asp Trp Ala Gln Ile Ala Gly Thr Thr Leu	
95 100 105	

ggc ttc tgg ggc cag gga gtc ctg gtc acc gtc tcc tca 423
Gly Phe Trp Gly Gln Gly Val Leu Val Thr Val Ser Ser
110 115 120

<210> 4
<211> 141
<212> PRT
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

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-15 -10 -5
Val Leu Ser Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Val Val Lys
-1 1 5 10
Pro Ser Glu Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Val
15 20 25
Ser Ser Ser Asn Trp Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly
30 35 40 45
Leu Glu Trp Ile Gly Arg Ile Ser Gly Ser Gly Gly Ala Thr Asn Tyr
50 55 60
Asn Pro Ser Leu Lys Ser Arg Val Ile Ile Ser Gln Asp Thr Ser Lys
65 70 75
Asn Gln Phe Ser Leu Asn Leu Asn Ser Val Thr Ala Ala Asp Thr Ala
80 85 90
Val Tyr Tyr Cys Ala Arg Asp Trp Ala Gln Ile Ala Gly Thr Thr Leu
95 100 105
Gly Phe Trp Gly Gln Gly Val Leu Val Thr Val Ser Ser
110 115 120

<210> 5
<211> 387
<212> DNA
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<222> (1)..(66)
<223> leader sequence

<220>

<221> mat_peptide

<222> (67)..(387)

<220>

<221> CDS

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<400> 5

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atg gac atg agg gtc ccc gct cag ctc ctg ggg ctc ctt ctg ctc tgg 48
Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
      -20              -15              -10

ctc cca ggt gcc aga tgt gac atc cag atg acc cag tct cca tct tcc 96
Leu Pro Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
      -5              -1  1              5              10

ctg tct gca tct gta ggg gac aga gtc acc atc act tgc agg gca agt 144
Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
              15              20              25

cag gac att agg tat tat tta aat tgg tat cag cag aaa cca gga aaa 192
Gln Asp Ile Arg Tyr Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys
              30              35              40

gct cct aag ctc ctg atc tat gtt gca tcc agt ttg caa agt ggg gtc 240
Ala Pro Lys Leu Leu Ile Tyr Val Ala Ser Ser Leu Gln Ser Gly Val
              45              50              55

cca tca agg ttc agc ggc agt gga tct ggg aca gag ttc act ctc acc 288
Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr
              60              65              70

gtc agc agc ctg cag cct gaa gat ttt gcg act tat tac tgt cta cag 336
Val Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln
              75              80              85              90

gtt tat agt acc cct cgg acg ttc ggc caa ggg acc aag gtg gaa atc 384
Val Tyr Ser Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
              95              100              105

aaa 387
Lys

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<210> 6

<211> 129

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<400> 6

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Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
      -20              -15              -10

Leu Pro Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser

```


-5	-1	1	5	10
Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser				
	15		20	25
Gln Asp Ile Arg Tyr Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys				
	30		35	40
Ala Pro Lys Leu Leu Ile Tyr Val Ala Ser Ser Leu Gln Ser Gly Val				
	45		50	55
Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr				
	60		65	70
Val Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln				
	75		80	85
Val Tyr Ser Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile				
	95		100	105

Lys

<210> 7
 <211> 411
 <212> DNA
 <213> Artificial Sequence

<220>
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 <222> (1)..(57)
 <223> leader sequence

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 <222> (58)..(411)

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 <222> (1)..(411)

<400> 7

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Met Glu Phe Gly Leu Ser Trp Val Phe Leu Val Pro Leu Leu Lys Gly	
	-15 -10 -5
gtc cag tgt gag gtg cag ctg gtg gag tct ggg ggc ggc ttg gca aag	96
Val Gln Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Lys	
	-1 1 5 10
cct ggg ggg tcc ctg aga ctc tcc tgc gca gcc tcc ggg ttc agg ttc	144
Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe	
	15 20 25

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acc ttc aat aac tac tac atg gac tgg gtc cgc cag gct cca ggg cag 192
Thr Phe Asn Asn Tyr Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Gln
30 35 40 45

ggg ctg gag tgg gtc tca cgt att agt agt agt ggt gat ccc aca tgg 240
Gly Leu Glu Trp Val Ser Arg Ile Ser Ser Ser Gly Asp Pro Thr Trp
50 55 60

tac gca gac tcc gtg aag ggc aga ttc acc atc tcc aga gag aac gcc 288
Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala
65 70 75

aac aac aca ctg ttt ctt caa atg aac agc ctg aga gct gag gac acg 336
Asn Asn Thr Leu Phe Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr
80 85 90

gct gtc tat tac tgt gcg agc ttg act aca ggg tct gac tcc tgg ggc 384
Ala Val Tyr Tyr Cys Ala Ser Leu Thr Thr Gly Ser Asp Ser Trp Gly
95 100 105

cag gga gtc ctg gtc acc gtc tcc tca 411
Gln Gly Val Leu Val Thr Val Ser Ser
110 115

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<210> 8
<211> 137
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<400> 8

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Met Glu Phe Gly Leu Ser Trp Val Phe Leu Val Pro Leu Leu Lys Gly
-15 -10 -5

Val Gln Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Lys
-1 1 5 10

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe
15 20 25

Thr Phe Asn Asn Tyr Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Gln
30 35 40 45

Gly Leu Glu Trp Val Ser Arg Ile Ser Ser Ser Gly Asp Pro Thr Trp
50 55 60

Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala
65 70 75

Asn Asn Thr Leu Phe Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr
80 85 90

Ala Val Tyr Tyr Cys Ala Ser Leu Thr Thr Gly Ser Asp Ser Trp Gly
95 100 105

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Gln Gly Val Leu Val Thr Val Ser Ser
110 115

<210> 9
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<210> 10
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<212> DNA
<213> Artificial Sequence

<220>
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<210> 11
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
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atcacagatc tctcaccatg gaarccccag ckacg 35

<210> 12
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<212> DNA
<213> Artificial Sequence

<220>
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<210> 13
<211> 32
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<223> Description of Artificial Sequence: Primer

<400> 13

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32

<210> 14

<211> 34

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

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34

<210> 15

<211> 34

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

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34

<210> 16

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 16

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35

<210> 17

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 17

cttgggctga cctaggacgg t

21

<210> 18

<211> 30

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 18

gcgactaagt cgaccatgga ctggacctgg

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<210> 19

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 19

gcgactaagt cgaccatgaa acacctgtgg

30

<210> 20

<211> 33

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

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gcgactaagt cgaccatgga gtttgggctg agc

33

<210> 21

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 21

gcgactaagt cgaccatggg gtcaaccgcc atc

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<210> 22

<211> 33

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 22

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33

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<212> DNA
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<400> 23

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<211> 31
<212> DNA
<213> Artificial Sequence

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<400> 24

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<210> 25
<211> 51
<212> DNA
<213> Artificial Sequence

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<210> 26
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26

atttaggtga cactata

17

<210> 27
<211> 16
<212> DNA
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<223> Description of Artificial Sequence: Primer

<400> 27

gttttcccag tcacga

16

<210> 28

<211> 20

<212> DNA

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<223> Description of Artificial Sequence: Primer

<400> 28

atatacgact cactataggg

20

<210> 29

<211> 24

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 29

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<210> 30

<211> 20

<212> DNA

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<400> 30

gcagttccag atttcaactg

20

<210> 31

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<212> DNA

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<223> Description of Artificial Sequence: Primer

<400> 31

ccaggccact gtcacggctt c

21

<210> 32

<211> 20

<212> DNA

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<223> Description of Artificial Sequence: Primer

<400> 32

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20

<210> 33

<211> 20

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

<400> 33

gccccagag gtgctcttgg

20

<210> 34

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 34

acacagacc gtcgacatgg

20

<210> 35

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 35

gctctcggag gtgctcctgg

20

<210> 36

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 36

acagaccgt cgaccatgga gtttgggctg

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<210> 37
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 37

ccccttggtg ctagctgagg agacggt 27

<210> 38
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 38

agagagaacg ccaagaacac actgttt 27

<210> 39
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 39

aaacagtgtg ttcttgccgt tctctct 27

SEQUENCE LISTING

<160> NUMBER OF SEQ ID NOS: 39

<210> SEQ ID NO 1
 <211> LENGTH: 390
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 <213> ORGANISM: Homo sapiens
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 <221> NAME/KEY: sig_peptide
 <222> LOCATION: (1)..(58)
 <220> FEATURE:
 <221> NAME/KEY: mat_peptide
 <222> LOCATION: (58)..(390)
 <220> FEATURE:
 <221> NAME/KEY: CDS
 <222> LOCATION: (1)..(390)

<400> SEQUENCE: 1

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-15 -10 -5	
tcc tgg gct cag tct gcc ccg act cag cct ccc tct gtg tct ggg tct	96
Ser Trp Ala Gln Ser Ala Pro Thr Gln Pro Pro Ser Val Ser Gly Ser	
-1 1 5 10	
cct gga cag tcg gtc acc atc tcc tgc act gga acc agc gat gac gtt	144
Pro Gly Gln Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Asp Asp Val	
15 20 25	
ggt ggt tat aac tat gtc tcc tgg tac caa cac cac cca ggc aaa gcc	192
Gly Gly Tyr Asn Tyr Val Ser Trp Tyr Gln His His Pro Gly Lys Ala	
30 35 40 45	
ccc aaa ctc atg att tat gat gtc gct aag cgg gcc tca ggg gtc tct	240
Pro Lys Leu Met Ile Tyr Asp Val Ala Lys Arg Ala Ser Gly Val Ser	
50 55 60	
gat cgc ttc tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc	288
Asp Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile	
65 70 75	
tct ggg ctc cag gct gag gac gag gct gat tat tac tgt tgt tca tat	336
Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr	
80 85 90	
aca acc agt agc act ttg tta ttc gga aga ggg acc cgg ttg acc gtc	384
Thr Thr Ser Ser Thr Leu Leu Phe Gly Arg Gly Thr Arg Leu Thr Val	
95 100 105	
cta ggt	390
Leu Gly	
110	

<210> SEQ ID NO 2
 <211> LENGTH: 423
 <212> TYPE: DNA
 <213> ORGANISM: Homo sapiens
 <220> FEATURE:
 <221> NAME/KEY: sig_peptide
 <222> LOCATION: (1)..(58)
 <220> FEATURE:
 <221> NAME/KEY: mat_peptide
 <222> LOCATION: (58)..(423)
 <220> FEATURE:
 <221> NAME/KEY: CDS
 <222> LOCATION: (1)..(423)

<400> SEQUENCE: 2

atg aaa cac ctg tgg ttc ttc ctc ctc ctg gtg gca gct ccc aga tgg	48
Met Lys His Leu Trp Phe Phe Leu Leu Val Ala Ala Pro Arg Trp	
-15 -10 -5	
gtc ctg tcc cag ctg cag ctg cag gag tcg ggc cca gga gtg gtg aag	96

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Val	Leu	Ser	Gln	Leu	Gln	Leu	Gln	Glu	Ser	Gly	Pro	Gly	Val	Val	Lys	
	-1	1					5					10				
cct	tcg	gag	acc	ctg	tcc	ctc	acc	tgc	gct	gtc	tct	ggg	ggc	tct	gtc	144
Pro	Ser	Glu	Thr	Leu	Ser	Leu	Thr	Cys	Ala	Val	Ser	Gly	Gly	Ser	Val	
	15					20				25						
agc	agt	agt	aac	tgg	tgg	acc	tgg	atc	cgc	cag	ccc	cca	ggg	aag	gga	192
Ser	Ser	Ser	Asn	Trp	Trp	Thr	Trp	Ile	Arg	Gln	Pro	Pro	Gly	Lys	Gly	
	30			35					40					45		
ctg	gag	tgg	att	gga	cgt	atc	tct	ggg	agg	ggg	gcc	acc	aac	tac		240
Leu	Glu	Trp	Ile	Gly	Arg	Ile	Ser	Gly	Ser	Gly	Gly	Ala	Thr	Asn	Tyr	
			50				55						60			
aac	ccg	tcc	ctc	aag	agt	cga	gtc	atc	att	tca	caa	gac	acg	tcc	aag	288
Asn	Pro	Ser	Leu	Lys	Ser	Arg	Val	Ile	Ser	Gln	Asp	Thr	Ser	Lys		
		65				70					75					
aac	cag	ttc	tcc	ctg	aac	ctg	aac	tct	gtg	acc	gcc	gcg	gac	acg	gcc	336
Asn	Gln	Phe	Ser	Leu	Asn	Leu	Asn	Ser	Val	Thr	Ala	Ala	Asp	Thr	Ala	
	80					85					90					
gtg	tat	tac	tgt	gcc	aga	gat	tgg	gcc	caa	ata	gct	gga	aca	acg	cta	384
Val	Tyr	Tyr	Cys	Ala	Arg	Asp	Trp	Ala	Gln	Ile	Ala	Gly	Thr	Thr	Leu	
	95				100				105							
ggc	ttc	tgg	ggc	cag	gga	gtc	ctg	gtc	acc	gtc	tcc	tca				423
Gly	Phe	Trp	Gly	Gln	Gly	Val	Leu	Val	Thr	Val	Ser	Ser				
	110			115				120								

<210> SEQ ID NO 3
 <211> LENGTH: 387
 <212> TYPE: DNA
 <213> ORGANISM: Homo sapiens
 <220> FEATURE:
 <221> NAME/KEY: sig_peptide
 <222> LOCATION: (1)..(67)
 <220> FEATURE:
 <221> NAME/KEY: mat_peptide
 <222> LOCATION: (67)..(387)
 <220> FEATURE:
 <221> NAME/KEY: CDS
 <222> LOCATION: (1)..(387)
 <400> SEQUENCE: 3

atg	gac	atg	agg	gtc	ccc	gct	cag	ctc	ctg	ggg	ctc	ctt	ctg	ctc	tgg	48
Met	Asp	Met	Arg	Val	Pro	Ala	Gln	Leu	Leu	Gly	Leu	Leu	Leu	Leu	Trp	
	-20					-15					-10					
ctc	cca	ggg	gcc	aga	tgt	gac	atc	cag	atg	acc	cag	tct	cca	tct	tcc	96
Leu	Pro	Gly	Ala	Arg	Cys	Asp	Ile	Gln	Met	Thr	Gln	Ser	Pro	Ser	Ser	
	-5			-1	1				5					10		
ctg	tct	gca	tct	gta	ggg	gac	aga	gtc	acc	atc	act	tgc	agg	gca	agt	144
Leu	Ser	Ala	Ser	Val	Gly	Asp	Arg	Val	Thr	Ile	Thr	Cys	Arg	Ala	Ser	
		15				20						25				
cag	gac	att	agg	tat	tat	tta	aat	tgg	tat	cag	cag	aaa	cca	gga	aaa	192
Gln	Asp	Ile	Arg	Tyr	Tyr	Leu	Asn	Trp	Tyr	Gln	Gln	Lys	Pro	Gly	Lys	
	30					35						40				
gct	cct	aag	ctc	ctg	atc	tat	gtt	gca	tcc	agt	ttg	caa	agt	ggg	gtc	240
Ala	Pro	Lys	Leu	Leu	Ile	Tyr	Val	Ala	Ser	Ser	Leu	Gln	Ser	Gly	Val	
	45				50						55					
cca	tca	agg	ttc	agc	ggc	agt	gga	tct	ggg	aca	gag	ttc	act	ctc	acc	288
Pro	Ser	Arg	Phe	Ser	Gly	Ser	Gly	Ser	Gly	Thr	Glu	Phe	Thr	Leu	Thr	
	60				65					70						
gtc	agc	agc	ctg	cag	cct	gaa	gat	ttt	gcg	act	tat	tac	tgt	cta	cag	336
Val	Ser	Ser	Leu	Gln	Pro	Glu	Asp	Phe	Ala	Thr	Tyr	Tyr	Cys	Leu	Gln	
	75			80				85						90		
gtt	tat	agt	acc	cct	cgg	acg	ttc	ggc	caa	ggg	acc	aag	gtg	gaa	atc	384
Val	Tyr	Ser	Thr	Pro	Arg	Thr	Phe	Gly	Gln	Gly	Thr	Lys	Val	Glu	Ile	
		95				100						105				

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aaa 387
 Lys

<210> SEQ ID NO 4
 <211> LENGTH: 411
 <212> TYPE: DNA
 <213> ORGANISM: Homo sapiens
 <220> FEATURE:
 <221> NAME/KEY: sig_peptide
 <222> LOCATION: (1)..(58)
 <220> FEATURE:
 <221> NAME/KEY: mat_peptide
 <222> LOCATION: (58)..(411)
 <220> FEATURE:
 <221> NAME/KEY: CDS
 <222> LOCATION: (1)..(411)

<400> SEQUENCE: 4

atg gag ttt ggg ctg agc tgg gtt ttc ctt gtt cct ctt ttg aaa ggt	48
Met Glu Phe Gly Leu Ser Trp Val Phe Leu Val Pro Leu Leu Lys Gly	
-15 -10 -5	
gtc cag tgt gag gtg cag ctg gtg gag tct ggg ggc ggc ttg gca aag	96
Val Gln Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Lys	
-1 1 5 10	
cct ggg ggg tcc ctg aga ctc tcc tgc gca gcc tcc ggg ttc agg ttc	144
Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe	
15 20 25	
acc ttc aat aac tac tac atg gac tgg gtc cgc cag gct cca ggg cag	192
Thr Phe Asn Asn Tyr Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Gln	
30 35 40 45	
ggg ctg gag tgg gtc tca cgt att agt agt agt ggt gat ccc aca tgg	240
Gly Leu Glu Trp Val Ser Arg Ile Ser Ser Ser Gly Asp Pro Thr Trp	
50 55 60	
tac gca gac tcc gtg aag ggc aga ttc acc atc tcc aga gag aac gcc	288
Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala	
65 70 75	
aac aac aca ctg ttt ctt caa atg aac agc ctg aga gct gag gac acg	336
Asn Asn Thr Leu Phe Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr	
80 85 90	
gct gtc tat tac tgt gcg agc ttg act aca ggg tct gac tcc tgg ggc	384
Ala Val Tyr Tyr Cys Ala Ser Leu Thr Thr Gly Ser Asp Ser Trp Gly	
95 100 105	
cag gga gtc ctg gtc acc gtc tcc tca	411
Gln Gly Val Leu Val Thr Val Ser Ser	
110 115	

<210> SEQ ID NO 5
 <211> LENGTH: 41
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 5

atcacagatc tctcaccatg gacatgaggg tccccgtca g	41
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<210> SEQ ID NO 6
 <211> LENGTH: 35
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 6

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atcacagatc tctcaccatg aggtccctg ctacg 35

<210> SEQ ID NO 7
<211> LENGTH: 35
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 7

atcacagatc tctcaccatg gaarccccag ckcag 35

<210> SEQ ID NO 8
<211> LENGTH: 38
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 8

atcacagatc tctcaccatg gtgttcgaga cccaggtc 38

<210> SEQ ID NO 9
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 9

ggtgcagcca ccgtagcttt gatytccasc tt 32

<210> SEQ ID NO 10
<211> LENGTH: 34
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 10

atcacagatc tctcaccatg rcctgstccc ctct 34

<210> SEQ ID NO 11
<211> LENGTH: 34
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 11

atcacagatc tctcaccatg gcctggrctc ygct 34

<210> SEQ ID NO 12
<211> LENGTH: 35
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 12

atcacagatc tctcaccatg gcmtggaycc ctctc 35

<210> SEQ ID NO 13
<211> LENGTH: 21
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence

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<220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 13
 cttgggctga cctaggacgg t 21

 <210> SEQ ID NO 14
 <211> LENGTH: 30
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 14
 gcgactaagt cgaccatgga ctggacctgg 30

 <210> SEQ ID NO 15
 <211> LENGTH: 30
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 15
 gcgactaagt cgaccatgaa acacctgtgg 30

 <210> SEQ ID NO 16
 <211> LENGTH: 33
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 16
 gcgactaagt cgaccatgga gtttgggctg agc 33

 <210> SEQ ID NO 17
 <211> LENGTH: 33
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 17
 gcgactaagt cgaccatggg gtcaaccgcc atc 33

 <210> SEQ ID NO 18
 <211> LENGTH: 33
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 18
 gcgactaagt cgaccatgtc tgtctccttc ctc 33

 <210> SEQ ID NO 19
 <211> LENGTH: 46
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

 <400> SEQUENCE: 19
 gccaggggga agaccgatgg gcccttggtg ctagctgagg agacgg 46

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<210> SEQ ID NO 20
<211> LENGTH: 31
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 20

gatgggccct tgggtgctagc tgaggagacg g

31

<210> SEQ ID NO 21
<211> LENGTH: 51
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 21

ggtgctagct gaggagacgg tgaccaggac tcctggccc cagaagccta g

51

<210> SEQ ID NO 22
<211> LENGTH: 17
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 22

atttagtgta cactata

17

<210> SEQ ID NO 23
<211> LENGTH: 16
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 23

gttttcccag tcacga

16

<210> SEQ ID NO 24
<211> LENGTH: 20
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 24

atatacgact cactataggg

20

<210> SEQ ID NO 25
<211> LENGTH: 24
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 25

ccgtcagatc gcctggagac gccca

24

<210> SEQ ID NO 26
<211> LENGTH: 20
<212> TYPE: DNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

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<400> SEQUENCE: 26

gcagttccag atttcaactg

20

<210> SEQ ID NO 27

<211> LENGTH: 21

<212> TYPE: DNA

<213> ORGANISM: Artificial Sequence

<220> FEATURE:

<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 27

ccaggccact gtcacggctt c

21

<210> SEQ ID NO 28

<211> LENGTH: 20

<212> TYPE: DNA

<213> ORGANISM: Artificial Sequence

<220> FEATURE:

<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 28

cagagctggg tacgtcctca

20

<210> SEQ ID NO 29

<211> LENGTH: 20

<212> TYPE: DNA

<213> ORGANISM: Artificial Sequence

<220> FEATURE:

<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 29

gcccccagag gtgctcttgg

20

<210> SEQ ID NO 30

<211> LENGTH: 20

<212> TYPE: DNA

<213> ORGANISM: Artificial Sequence

<220> FEATURE:

<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 30

acacagaccc gtcgacatgg

20

<210> SEQ ID NO 31

<211> LENGTH: 20

<212> TYPE: DNA

<213> ORGANISM: Artificial Sequence

<220> FEATURE:

<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 31

gtctcggag gtgctcctgg

20

<210> SEQ ID NO 32

<211> LENGTH: 30

<212> TYPE: DNA

<213> ORGANISM: Artificial Sequence

<220> FEATURE:

<223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 32

acagaccgt cgaccatgga gtttgggctg

30

<210> SEQ ID NO 33

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<211> LENGTH: 27
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 33

ccccttggtg ctagctgagg agacggt

27

<210> SEQ ID NO 34
 <211> LENGTH: 27
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 34

agagagaacg ccaagaacac actgttt

27

<210> SEQ ID NO 35
 <211> LENGTH: 27
 <212> TYPE: DNA
 <213> ORGANISM: Artificial Sequence
 <220> FEATURE:
 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer

<400> SEQUENCE: 35

aaacagtgtg ttcttggcgt tctctct

27

<210> SEQ ID NO 36
 <211> LENGTH: 130
 <212> TYPE: PRT
 <213> ORGANISM: Homo sapiens

<400> SEQUENCE: 36

Met Ala Trp Thr Leu Leu Leu Val Thr Leu Leu Thr Gln Gly Thr Gly
 -15 -10 -5

Ser Trp Ala Gln Ser Ala Pro Thr Gln Pro Pro Ser Val Ser Gly Ser
 -1 1 5 10

Pro Gly Gln Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Asp Asp Val
 15 20 25

Gly Gly Tyr Asn Tyr Val Ser Trp Tyr Gln His His Pro Gly Lys Ala
 30 35 40 45

Pro Lys Leu Met Ile Tyr Asp Val Ala Lys Arg Ala Ser Gly Val Ser
 50 55 60

Asp Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile
 65 70 75

Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr
 80 85 90

Thr Thr Ser Ser Thr Leu Leu Phe Gly Arg Gly Thr Arg Leu Thr Val
 95 100 105

Leu Gly
 110

<210> SEQ ID NO 37
 <211> LENGTH: 141
 <212> TYPE: PRT
 <213> ORGANISM: Homo sapiens

<400> SEQUENCE: 37

Met Lys His Leu Trp Phe Phe Leu Leu Leu Val Ala Ala Pro Arg Trp
 -15 -10 -5

-continued

Val Leu Ser Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Val Val Lys
 -1 1 5 10
 Pro Ser Glu Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Val
 15 20 25
 Ser Ser Ser Asn Trp Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly
 30 35 40 45
 Leu Glu Trp Ile Gly Arg Ile Ser Gly Ser Gly Gly Ala Thr Asn Tyr
 50 55 60
 Asn Pro Ser Leu Lys Ser Arg Val Ile Ile Ser Gln Asp Thr Ser Lys
 65 70 75
 Asn Gln Phe Ser Leu Asn Leu Asn Ser Val Thr Ala Ala Asp Thr Ala
 80 85 90
 Val Tyr Tyr Cys Ala Arg Asp Trp Ala Gln Ile Ala Gly Thr Thr Leu
 95 100 105
 Gly Phe Trp Gly Gln Gly Val Leu Val Thr Val Ser Ser
 110 115 120

<210> SEQ ID NO 38
 <211> LENGTH: 129
 <212> TYPE: PRT
 <213> ORGANISM: Homo sapiens

<400> SEQUENCE: 38

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Trp
 -20 -15 -10
 Leu Pro Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
 -5 -1 1 5 10
 Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
 15 20 25
 Gln Asp Ile Arg Tyr Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys
 30 35 40
 Ala Pro Lys Leu Leu Ile Tyr Val Ala Ser Ser Leu Gln Ser Gly Val
 45 50 55
 Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr
 60 65 70
 Val Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln
 75 80 85 90
 Val Tyr Ser Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
 95 100 105

Lys

<210> SEQ ID NO 39
 <211> LENGTH: 137
 <212> TYPE: PRT
 <213> ORGANISM: Homo sapiens

<400> SEQUENCE: 39

Met Glu Phe Gly Leu Ser Trp Val Phe Leu Val Pro Leu Leu Lys Gly
 -15 -10 -5
 Val Gln Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Lys
 -1 1 5 10
 Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe
 15 20 25
 Thr Phe Asn Asn Tyr Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Gln
 30 35 40 45

-continued

Gly	Leu	Glu	Trp	Val	Ser	Arg	Ile	Ser	Ser	Ser	Gly	Asp	Pro	Thr	Trp	
				50					55					60		
Tyr	Ala	Asp	Ser	Val	Lys	Gly	Arg	Phe	Thr	Ile	Ser	Arg	Glu	Asn	Ala	
			65				70						75			
Asn	Asn	Thr	Leu	Phe	Leu	Gln	Met	Asn	Ser	Leu	Arg	Ala	Glu	Asp	Thr	
		80					85					90				
Ala	Val	Tyr	Tyr	Cys	Ala	Ser	Leu	Thr	Thr	Gly	Ser	Asp	Ser	Trp	Gly	
	95				100					105						
Gln	Gly	Val	Leu	Val	Thr	Val	Ser	Ser								
110					115											

What is claimed is:

1. A method of inhibiting production of IgE in a human subject with an IgE-mediated allergic disorder comprising parenterally administering an IgE production inhibiting amount of an anti-human CD23 monoclonal antibody comprising a human gamma-1 constant region;

which antibody comprises the complementarity-determining regions CDR1, CDR2, and CDR3 of the light and heavy chains of antibody 6G5 or of antibody 5E8; wherein

CDR1, CDR2, and CDR3 of the light chain of antibody 6G5 are the polypeptides encoded by nucleotides 124-165, 211-231, and 328-357, respectively, of SEQ ID NO. 1;

CDR1, CDR2, and CDR3 of the heavy chain of antibody 6G5 are the polypeptides encoded by nucleotides 148-165, 208-258, and 355-390, respectively, of SEQ ID NO. 3;

CDR1, CDR2, and CDR3 of the light chain of antibody 5E8 are the polypeptides encoded by nucleotides 136-168, 214-234, and 331-357 respectively, of SEQ ID NO. 5; and

CDR1, CDR2, and CDR3 of the heavy chain of antibody 5E8 are the polypeptides encoded by nucleotides 148-168, 211-261, and 358-378, respectively, of SEQ ID NO. 7.

2. The method of claim 1, wherein the anti-human CD23 monoclonal antibody that is administered is a humanized antibody.

3. The method of claim 1, wherein the anti-human CD23 monoclonal antibody that is administered inhibits IL-4 induced production of IgE.

4. A method of treating an IgE mediated allergic disorder in a human subject comprising parenterally administering a therapeutically effective amount of an anti-human CD23 monoclonal antibody comprising a human gamma-1 constant region; which antibody comprises the complementarity-determining regions CDR1, CDR2, and CDR3 of the light and heavy chains of antibody 6G5 or of antibody 5E8; wherein

CDR1, CDR2, and CDR3 of the light chain of antibody 6G5 are the polypeptides encoded by nucleotides 124-165, 211-231, and 328-357, respectively, of SEQ ID NO. 1;

CDR1, CDR2, and CDR3 of the heavy chain of antibody 6G5 are the polypeptides encoded by nucleotides 148-165, 208-258, and 355-390, respectively, of SEQ ID NO. 3;

CDR1, CDR2, and CDR3 of the light chain of antibody 5E8 are the polypeptides encoded by nucleotides 136-168, 214-234, and 331-357, respectively, of SEQ ID NO. 5; and

CDR1, CDR2, and CDR3 of the heavy chain of antibody 5E8 are the polypeptides encoded by nucleotides 148-168, 211-261, and 358-378, respectively, of SEQ ID NO. 7.

5. The method of claim 4, wherein said allergic disorder is selected from the group consisting of allergic rhinitis, allergic contact dermatitis, anaphylactic reactions, asthma, and bronchitis.

6. The method of claim 4, wherein parenteral administration includes subcutaneous, intravenous, intramuscular, rectal, vaginal and intraperitoneal administration.

7. The method of claim 6, wherein the antibody is administered by subcutaneous administration.

8. The method of claim 6, wherein the antibody is lyophilized for storage and reconstituted prior to administration.

9. The method of claim 1, wherein the anti-human CD23 monoclonal antibody that is administered comprises the variable regions of the light and heavy chains of antibody 6G5 having the sequences shown as amino acids 1-111 of SEQ ID NO: 2 and amino acids 1-122 of SEQ ID NO: 4, respectively.

10. The method of claim 1, wherein the anti-human CD23 monoclonal antibody that is administered comprises the variable regions of the light and heavy chains of antibody 5E8 having the amino acid sequences shown as amino acids 1-107 of SEQ ID NO: 6 and amino acids 1-118 SEQ ID NO: 8, respectively.

11. The method of claim 1, wherein said allergic disorder is selected from the group consisting of allergic rhinitis, allergic contact dermatitis, anaphylactic reactions, asthma, and bronchitis.

12. The method of claim 1, wherein parenteral administration includes subcutaneous, intramuscular, intravenous, rectal, vaginal and intraperitoneal administration.

13. The method of claim 12, wherein the antibody is administered by subcutaneous administration.

14. The method of claim 1, wherein the anti-human CD23 monoclonal antibody that is administered comprises the complementarity-determining regions CDR1, CDR2, and CDR3 of the light and heavy chains of antibody 6G5; wherein

CDR1, CDR2, and CDR3 of the light chain of antibody 6G5 are the polypeptides encoded by nucleotides 124-165, 211-231, and 328-357, respectively, of SEQ ID NO. 1; and

CDR1, CDR2, and CDR3 of the heavy chain of antibody 6G5 are the polypeptides encoded by nucleotides

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CERTIFICATE OF CORRECTION**

Page 1 of 33

PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Col. 9, line 16
replace "Sigman"
with --Sigma--.

Col. 30, line 54
replace "6G5"
with --5E8--.

Delete Columns 47-64 and Columns 65-66, lines 1-14, and insert the attached pages.

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Page 2 of 33

PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

SEQUENCE LISTING

<110> REFF, MITCHELL E.
KLOETZER, WILLIAM S.
NAKAMURA, TAKEHIKO

<120> GAMMA-1 AND GAMMA-3 ANTI-HUMAN CD23 MONOCLONAL ANTIBODIES AND USE
THEREOF AS THERAPEUTICS

<130> 037003-0275739

<140> 09/292,053

<141> 1999-04-14

<150> 08/803,085

<151> 1997-02-20

<160> 39

<170> PatentIn Ver. 2.1

<210> 1

<211> 390

<212> DNA

<213> Artificial Sequence

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PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

tcc tgg gct cag tct gcc ccg act cag cct ccc tct gtg tct ggg tct 96
Ser Trp Ala Gln Ser Ala Pro Thr Gln Pro Pro Ser Val Ser Gly Ser
-1 1 5 10

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PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

cct gga cag tgc gtc acc atc tcc tgc act gga acc agc gat gac gtt	144
Pro Gly Gln Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Asp Asp Val	
15 20 25	
ggt ggt tat aac tat gtc tcc tgg tac caa cac cac cca ggc aaa gcc	192
Gly Gly Tyr Asn Tyr Val Ser Trp Tyr Gln His His Pro Gly Lys Ala	
30 35 40 45	
ccc aaa ctc atg att tat gat gtc gct aag cgg gcc tca ggg gtc tct	240
Pro Lys Leu Met Ile Tyr Asp Val Ala Lys Arg Ala Ser Gly Val Ser	
50 55 60	
gat cgc ttc tct ggc tcc aag tct ggc aac acg gcc tcc ctg acc atc	288
Asp Arg Phe Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile	
65 70 75	
tct ggg ctc cag gct gag gac gag gct gat tat tac tgt tgt tca tat	336
Ser Gly Leu Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Cys Ser Tyr	
80 85 90	
aca acc agt agc act ttg tta ttc gga aga ggg acc cgg ttg acc gtc	384
Thr Thr Ser Ser Thr Leu Leu Phe Gly Arg Gly Thr Arg Leu Thr Val	
95 100 105	

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Page 5 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

cta ggt 390
 Leu Gly
 110

<210> 2
 <211> 130
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<400> 2

Met Ala Trp Thr Leu Leu Leu Val Thr Leu Leu Thr Gln Gly Thr Gly
 -15 -10 -5

Ser Trp Ala Gln Ser Ala Pro Thr Gln Pro Pro Ser Val Ser Gly Ser
 -1 1 5 10

Pro Gly Gln Ser Val Thr Ile Ser Cys Thr Gly Thr Ser Asp Asp Val
 15 20 25

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Page 6 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Gly	Gly	Tyr	Asn	Tyr	Val	Ser	Trp	Tyr	Gln	His	His	Pro	Gly	Lys	Ala
30					35				40					45	
Pro	Lys	Leu	Met	Ile	Tyr	Asp	Val	Ala	Lys	Arg	Ala	Ser	Gly	Val	Ser
				50					55					60	
Asp	Arg	Phe	Ser	Gly	Ser	Lys	Ser	Gly	Asn	Thr	Ala	Ser	Leu	Thr	Ile
			65					70					75		
Ser	Gly	Leu	Gln	Ala	Glu	Asp	Glu	Ala	Asp	Tyr	Tyr	Cys	Cys	Ser	Tyr
		80					85					90			
Thr	Thr	Ser	Ser	Thr	Leu	Leu	Phe	Gly	Arg	Gly	Thr	Arg	Leu	Thr	Val
	95					100					105				
Leu	Gly														
110															

<210> 3
 <211> 423
 <212> DNA
 <213> Artificial Sequence
 <220>

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Page 7 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<220>

<221> misc_feature

<222> (1)..(57)

<223> leader sequence

<220>

<221> mat_peptide

<222> (58)..(423)

<220>

<221> CDS

<222> (1)..(423)

<400> 3

atg	aaa	cac	ctg	tgg	ttc	ttc	ctc	ctc	ctg	gtg	gca	gct	ccc	aga	tgg	48
Met	Lys	His	Leu	Trp	Phe	Phe	Leu	Leu	Leu	Val	Ala	Ala	Pro	Arg	Trp	
			-15						-10					-5		

gtc	ctg	tcc	cag	ctg	cag	ctg	cag	gag	tgc	ggc	cca	gga	gtg	gtg	aag	96
Val	Leu	Ser	Gln	Leu	Gln	Leu	Gln	Glu	Ser	Gly	Pro	Gly	Val	Val	Lys	
	-1	1					5						10			

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PATENT NO. : 7,033,589
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 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

cct tgc gag acc ctg tcc ctc acc tgc gct gtc tct ggt ggc tct gtc	144
Pro Ser Glu Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Val	
15 20 25	
agc agt agt aac tgg tgg acc tgg atc cgc cag ccc cca ggg aag gga	192
Ser Ser Ser Asn Trp Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly	
30 35 40 45	
ctg gag tgg att gga cgt atc tct ggt agt ggt ggg gcc acc aac tac	240
Leu Glu Trp Ile Gly Arg Ile Ser Gly Ser Gly Gly Ala Thr Asn Tyr	
50 55 60	
aac ccg tcc ctc aag agt cga gtc atc att tca caa gac acg tcc aag	288
Asn Pro Ser Leu Lys Ser Arg Val Ile Ile Ser Gln Asp Thr Ser Lys	
65 70 75	
aac cag ttc tcc ctg aac ctg aac tct gtg acc gcc gcg gac acg gcc	336
Asn Gln Phe Ser Leu Asn Leu Asn Ser Val Thr Ala Ala Asp Thr Ala	
80 85 90	
gtg tat tac tgt gcc aga gat tgg gcc caa ata gct gga aca acg cta	384
Val Tyr Tyr Cys Ala Arg Asp Trp Ala Gln Ile Ala Gly Thr Thr Leu	
95 100 105	
ggc ttc tgg ggc cag gga gtc ctg gtc acc gtc tcc tca	423
Gly Phe Trp Gly Gln Gly Val Leu Val Thr Val Ser Ser	
110 115 120	

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PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 4
 <211> 141
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<400> 4

Met Lys His Leu Trp Phe Phe Leu Leu Leu Val Ala Ala Pro Arg Trp
 -15 -10 -5

Val Leu Ser Gln Leu Gln Leu Gln Glu Ser Gly Pro Gly Val Val Lys
 -1 1 5 10

Pro Ser Glu Thr Leu Ser Leu Thr Cys Ala Val Ser Gly Gly Ser Val
 15 20 25

Ser Ser Ser Asn Trp Trp Thr Trp Ile Arg Gln Pro Pro Gly Lys Gly
 30 35 40 45

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PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

```

Leu Glu Trp Ile Gly Arg Ile Ser Gly Ser Gly Gly Ala Thr Asn Tyr
                    50                      55                      60

Asn Pro Ser Leu Lys Ser Arg Val Ile Ile Ser Gln Asp Thr Ser Lys
                    65                      70                      75

Asn Gln Phe Ser Leu Asn Leu Asn Ser Val Thr Ala Ala Asp Thr Ala
                    80                      85                      90

Val Tyr Tyr Cys Ala Arg Asp Trp Ala Gln Ile Ala Gly Thr Thr Leu
                    95                      100                     105

Gly Phe Trp Gly Gln Gly Val Leu Val Thr Val Ser Ser
110                      115                      120

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<210> 5
 <211> 387
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

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Page 11 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<220>
 <221> misc_feature
 <222> (1) .. (66)
 <223> leader sequence

<220>
 <221> mat_peptide
 <222> (67) .. (387)

<220>
 <221> CDS
 <222> (1) .. (387)

<400> 5

atg	gac	atg	agg	gtc	ccc	gct	cag	ctc	ctg	ggg	ctc	ctt	ctg	ctc	tgg	48
Met	Asp	Met	Arg	Val	Pro	Ala	Gln	Leu	Leu	Gly	Leu	Leu	Leu	Leu	Trp	
			-20				-15					-10				

ctc	cca	ggg	gcc	aga	tgt	gac	atc	cag	atg	acc	cag	tct	cca	tct	tcc	96
Leu	Pro	Gly	Ala	Arg	Cys	Asp	Ile	Gln	Met	Thr	Gln	Ser	Pro	Ser	Ser	
	-5			-1	1				5					10		

ctg	tct	gca	tct	gta	ggg	gac	aga	gtc	acc	atc	act	tgc	agg	gca	agt	144
Leu	Ser	Ala	Ser	Val	Gly	Asp	Arg	Val	Thr	Ile	Thr	Cys	Arg	Ala	Ser	
			15					20					25			

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Page 12 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

cag gac att agg tat tat tta aat tgg tat cag cag aaa cca gga aaa	192
Gln Asp Ile Arg Tyr Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys	
30 35 40	
gct cct aag ctc ctg atc tat gtt gca tcc agt ttg caa agt ggg gtc	240
Ala Pro Lys Leu Leu Ile Tyr Val Ala Ser Ser Leu Gln Ser Gly Val	
45 50 55	
cca tca agg ttc agc ggc agt gga tct ggg aca gag ttc act ctc acc	288
Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr	
60 65 70	
gtc agc agc ctg cag cct gaa gat ttt gcg act tat tac tgt cta cag	336
Val Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln	
75 80 85 90	
gtt tat agt acc cct cgg acg ttc ggc caa ggg acc aag gtg gaa atc	384
Val Tyr Ser Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile	
95 100 105	
aaa	387
Lys	

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PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 6
 <211> 129
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<400> 6

Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Trp
 -20 -15 -10

Leu Pro Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
 -5 -1 1 5 10

Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
 15 20 25

Gln Asp Ile Arg Tyr Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys
 30 35 40

Ala Pro Lys Leu Leu Ile Tyr Val Ala Ser Ser Leu Gln Ser Gly Val
 45 50 55

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Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr
60 65 70

Val Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln
75 80 85 90

Val Tyr Ser Thr Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
95 100 105

Lys

```
<210> 7
<211> 411
<212> DNA
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

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<220>
<221> misc_feature
<222> (1) .. (57)
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Page 15 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<223> leader sequence

<220>

<221> mat_peptide

<222> (58) .. (411)

<220>

<221> CDS

<222> (1) .. (411)

<400> 7

atg gag ttt ggg ctg agc tgg gtt ttc ctt gtt cct ctt ttg aaa ggt	48
Met Glu Phe Gly Leu Ser Trp Val Phe Leu Val Pro Leu Leu Lys Gly	
-15 -10 -5	
gtc cag tgt gag gtg cag ctg gtg gag tct ggg ggc ggc ttg gca aag	96
Val Gln Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Lys	
-1 1 5 10	
cct ggg ggg tcc ctg aga ctc tcc tgc gca gcc tcc ggg ttc agg ttc	144
Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe	
15 20 25	

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Page 16 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

```

acc ttc aat aac tac tac atg gac tgg gtc cgc cag gct cca ggg cag   192
Thr Phe Asn Asn Tyr Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Gln
  30                               35                               40                               45

ggg ctg gag tgg gtc tca cgt att agt agt agt ggt gat ccc aca tgg   240
Gly Leu Glu Trp Val Ser Arg Ile Ser Ser Ser Gly Asp Pro Thr Trp
                               50                               55                               60

tac gca gac tcc gtg aag ggc aga ttc acc atc tcc aga gag aac gcc   288
Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala
                               65                               70                               75

aac aac aca ctg ttt ctt caa atg aac agc ctg aga gct gag gac acg   336
Asn Asn Thr Leu Phe Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr
                               80                               85                               90

gct gtc tat tac tgt gcg agc ttg act aca ggg tct gac tcc tgg ggc   384
Ala Val Tyr Tyr Cys Ala Ser Leu Thr Thr Gly Ser Asp Ser Trp Gly
  95                               100                               105

cag gga gtc ctg gtc acc gtc tcc tca                               411
Gln Gly Val Leu Val Thr Val Ser Ser
110                               115

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Page 17 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 8
 <211> 137
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Mature peptide is derived from Old World Monkey (macaque); leader sequence is an artificial sequence to facilitate cloning

<400> 8

Met Glu Phe Gly Leu Ser Trp Val Phe Leu Val Pro Leu Leu Lys Gly
 -15 -10 -5

Val Gln Cys Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Ala Lys
 -1 1 5 10

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Arg Phe
 15 20 25

Thr Phe Asn Asn Tyr Tyr Met Asp Trp Val Arg Gln Ala Pro Gly Gln
 30 35 40 45

Gly Leu Glu Trp Val Ser Arg Ile Ser Ser Ser Gly Asp Pro Thr Trp
 50 55 60

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Page 18 of 33

PATENT NO. : 7,033,589
 APPLICATION NO.: 09/292,053
 ISSUE DATE. : April 25, 2006
 INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

```

Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Glu Asn Ala
      65                      70                      75
Asn Asn Thr Leu Phe Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr
      80                      85                      90
Ala Val Tyr Tyr Cys Ala Ser Leu Thr Thr Gly Ser Asp Ser Trp Gly
      95                      100                     105
Gln Gly Val Leu Val Thr Val Ser Ser
110                      115

```

<210> 9
 <211> 41
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 9
 atcacagatc tctcaccatg gacatgaggg tccccgctca g 41

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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Page 19 of 33

PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 10
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 10

atcacagatc tctcaccatg aggctccctg ctcag 35

<210> 11
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 11

atcacagatc tctcaccatg gaarccccag ckcag 35

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Page 20 of 33

PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 12
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 12

atcacagatc tctcaccatg gtgttgcaga cccaggtc 38

<210> 13
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 13

ggtgcagcca ccgtagcttt gatytcacac tt 32

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Page 21 of 33

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ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 14
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 14

atcacagatc tctcaccatg rcttgstccc ctct

34

<210> 15
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 15

atcacagatc tctcaccatg gcctgggctc ygct

34

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Page 22 of 33

PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 16
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 16
atcacagatc tctcaccatg gcmgtggaycc ctctc 35

<210> 17
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 17
cttgggctga cctaggacgg t 21

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APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 18
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 18

gcgactaagt cgaccatgga ctggacctgg

30

<210> 19
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 19

gcgactaagt cgaccatgaa acacctgtgg

30

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PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 20
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 20

gcgactaagt cgaccatgga gtttgggctg agc 33

<210> 21
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21

gcgactaagt cgaccatggg gtcaaccgcc atc 33

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PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 22
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 22

gcgactaagt cgaccatgtc tgtctccttc etc

33

<210> 23
<211> 46
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 23

gccaggggga agaccgatgg gcccttggtg ctagctgagg agacgg

46

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PATENT NO. : 7,033,589
APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 24
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 24

gatgggccct tgggtgctagc tgaggagacg g 31

<210> 25
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 25

ggtgctagct gaggagacgg tgaccaggac tccctggccc cagaagccta g 51

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ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 26
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26

atttaggtga cactata

17

<210> 27
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 27

gttttcccag tcacga

16

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APPLICATION NO.: 09/292,053
ISSUE DATE. : April 25, 2006
INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 28
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 28

atatacgact cactataggg

20

<210> 29
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 29

ccgtcagatc gcctggagac gccca

24

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INVENTOR(S) : Mitchell E. REFF et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 30
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 30

gcagttccag atttcaactg 20

<210> 31
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 31

ccaggccact gtcacggctt c 21

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It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 32
<211> 20
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Primer

<400> 32

cagagctggg tacgtcctca

20

<210> 33
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 33

gccccccagag gtgctcttgg

20

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It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

<210> 34
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 34

acacagaccc gtcgacatgg 20

<210> 35
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 35

gctctcggag gtgctcctgg 20

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<210> 36
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 36

acagaccggt cgaccatgga gtttgggctg

30

<210> 37
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 37

ccccttggtg ctagctgagg agacggt

27

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<210> 38
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 38

agagagaacg ccaagaacac actgttt

27

<210> 39
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 39

aaacagtgtg ttcttggcgt tctctct

27

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